

What is claimed is:

1. A developing device comprising:

a developer carrier for conveying a developer, which consists of toner and magnetic carrier, deposited thereon and causing, in a developing zone, said developer to form a magnet brush with a main magnetic line of force issuing from a main magnetic pole, which is positioned inside said developer carrier, said toner being fed to an image carrier in said developing zone;

a first metering member positioned upstream of the developing zone in a direction of developer conveyance for regulating an amount of the developer being conveyed by said developer carrier toward said developing zone;

a space for collecting part of the developer removed by said first metering member;

a toner hopper adjoining said space for replenishing fresh toner to said developer carrier;

a second metering member positioned upstream of said first metering member in the direction of developer conveyance; and

a gap formed between said second metering member and said developer carrier for preventing, when a toner content of the developer on said developer carrier increases to increase a thickness of said developer forming a layer on said developer carrier, an increment

of said developer carrier from passing;

wherein a condition in which the developer and the fresh toner contact each other varies in accordance with the toner content of said developer present on said developer carrier for thereby varying a condition of replenishment of said fresh toner to said developer, and

at least one auxiliary magnetic line of force is positioned between the developing zone and said first metering member.

2. The device as claimed in claim 1, wherein a flux density ratio of said auxiliary magnetic line of force to said main magnetic line of force is 0.43 or above.

3. The device as claimed in claim 2, wherein an angle between a peak of said main magnetic line of force and a peak of said auxiliary line of force is 45° or below.

4. The device as claimed in claim 3, wherein an angle between said first metering member and the peak of said auxiliary magnetic line of force is 22° or above.

5. The device as claimed in claim 4, wherein said developer carrier has an outside diameter of 25 mm or below.

6. The device as claimed in claim 5, wherein an AC bias is applied to the developing zone.

7. The device as claimed in claim 1, wherein an angle between a peak of said main magnetic line of force and a peak of said auxiliary line of force is 45° or below.

8. The device as claimed in claim 7, wherein an angle between said first metering member and the peak of said auxiliary magnetic line of force is 22° or above.

9. The device as claimed in claim 8, wherein said developer carrier has an outside diameter of 25 mm or below.

10. The device as claimed in claim 9, wherein an AC bias is applied to the developing zone.

11. The device as claimed in claim 1, wherein an angle between said first metering member and the peak of said auxiliary magnetic line of force is 22° or above.

12. The device as claimed in claim 11, wherein said developer carrier has an outside diameter of 25 mm or below.

13. The device as claimed in claim 12, wherein an AC bias is applied to the developing zone.

14. The device as claimed in claim 1, wherein said developer carrier has an outside diameter of 25 mm or below.

15. The device as claimed in claim 14, wherein an AC bias is applied to the developing zone.

16. The device as claimed in claim 15, wherein an angle between a peak of said main magnetic line of force and a peak of said auxiliary line of force is 45° or below.

17. In an image forming apparatus including a developing device for feeding toner to a latent image formed on an image carrier to thereby form a corresponding toner image, said developing device comprising:

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a developer carrier for conveying a developer, which consists of the toner and magnetic carrier, deposited thereon and causing, in a developing zone, said developer to form a magnet brush with a main magnetic line of force issuing from a main magnetic pole, which is positioned inside said developer carrier, said toner being fed to an image carrier in said developing zone;

a first metering member positioned upstream of the developing zone in a direction of developer conveyance for regulating an amount of the developer being conveyed by said developer carrier toward said developing zone;

a space for collecting part of the developer removed by said first metering member;

a toner hopper adjoining said space for replenishing fresh toner to said developer carrier;

a second metering member positioned upstream of said first metering member in the direction of developer conveyance; and

a gap formed between said second metering member and said developer carrier for preventing, when a toner content of the developer on said developer carrier increases to increase a thickness of said developer forming a layer on said developer carrier, an increment of said developer carrier from passing;

wherein a condition in which the developer and the

fresh toner contact each other varies in accordance with the toner content of said developer present on said developer carrier for thereby varying a condition of replenishment of said fresh toner to said developer, and

at least one auxiliary magnetic line of force is positioned between the developing zone and said first metering member.

18. A developing device comprising:

a developer carrier accommodating magnetic field forming means thereinside for conveying a developer, which consists of toner and magnetic carrier, deposited thereon;

a first metering member for regulating an amount of the developer being conveyed by said developer carrier;

a space for collecting part of the developer removed by said first metering member;

a toner hopper adjoining said space for replenishing fresh toner to said developer carrier;

a second metering member positioned upstream of said first metering member in a direction of developer conveyance; and

a gap formed between said second metering member and said developer carrier for preventing, when a toner content of the developer on said developer carrier increases to increase a thickness of said developer forming a layer on said developer carrier, an increment

of said developer carrier from passing;

wherein a condition in which the developer and the fresh toner contact each other varies in accordance with the toner content of said developer present on said developer carrier for thereby varying a condition of replenishment of said fresh toner to said developer,

an exclusive agitating member for agitating the carrier and the toner is absent, and

said magnetic field forming means exerts a great magnetic force.

19. The device as claimed in claim 18, wherein said developer carrier has an outside diameter of 25 mm or below.

20. The device as claimed in claim 18, wherein an AC bias is applied to a developing zone where said developer carrier and an image carrier face each other.

21. A developing device comprising:

a developer carrier accommodating magnetic field forming means thereinside for conveying a developer, which consists of toner and magnetic carrier, deposited thereon;

a first metering member for regulating an amount of the developer being conveyed by said developer carrier;

a space for collecting part of the developer removed by said first metering member;

a toner hopper adjoining said space for replenishing

fresh toner to said developer carrier;
a second metering member positioned upstream of said first metering member in a direction of developer conveyance; and
a gap formed between said second metering member and said developer carrier for preventing, when a toner content of the developer on said developer carrier increases to increase a thickness of said developer forming a layer on said developer carrier, an increment of said developer carrier from passing;
wherein a condition in which the developer and the fresh toner contact each other varies in accordance with the toner content of said developer present on said developer carrier for thereby varying a condition of replenishment of said fresh toner to said developer, replenishment of the fresh toner to the developer is effected without control from outside of said developing device, and
said magnetic field forming means exerts a great magnetic force.